BACKGROUND AND FREQUENTLY ASKED QUESTIONS
WASTE TO ENERGY FACILITY

Rappahannock Regional Solid Waste Management Board
Stafford County/City of Fredericksburg

Background

The Rappahannock Regional Solid Waste Management Board (R-Board) has proven receptive to innovative ideas to efficiently manage the disposal of the municipal solid waste (MSW) generated by the communities we serve, while at the same time helping the environment. One such example of this commitment is the methane gas to electricity facility at the R-Board's Eskimo Hill site. Opened in 2008, this facility generates 2.14 megawatts of electricity from the methane gas generated by the landfill, which is enough to power 1,300 homes each day.

The R-Board is currently considering another project that will produce energy from the MSW that is disposed at the Eskimo Hill site. In 2012, the R-Board solicited proposals from firms interested in constructing an innovative energy production facility using the MSW delivered to the landfill at Eskimo Hill Road. The R-board had recently completed construction of a new location to receive MSW (Cell F), with a projected 10-year operational life, and the construction of a facility capable of converting MSW into energy would greatly extend the life of the new cell.

In November 2012, the R-Board received 3 proposals – 1 proposer subsequently withdrew from consideration – for evaluation. Following extensive examination of the 3 proposals, including interviews with each, the R-Board determined that the proposal from Energy Extraction Partners, LLC (EEP) was in the best interest of the residents served by the landfill. The principal advantages identified in this proposal are as follows:

- The R-Board receives an average of 135,000 tons of MSW per year, not including recyclable materials which are sorted out prior to weighing. The 135,000 tons of waste are buried within the sanitary landfill. A waste to energy (WtE) facility would convert approximately 85% of this waste material into useable electrical power, rather than burying it.
- The 85% reduction in landfill activities would significantly reduce operating expenses for labor and equipment, as well as maintenance expenses necessary to keep the equipment operational.
- The agreement allows the R-Board to continue to receive all user (tipping) fees currently collected by our operations.
- The reduction in landfilling volumes could extend the life of the new cell from 10 years to 60 years, realizing another substantial savings in operational costs.
- The proposal represents a private investment of over $65 million, along with a staff of about 65 employees.

Following negotiations, the R-Board entered into an agreement with EEP to construct a WtE facility on approximately 10 acres of leased property operated by the R-Board at the Eskimo Hill Road landfill site.

Key operational elements of the agreement are as follows:

- Construction of a waste to energy facility capable of producing 15 megawatts electric (MWE) on property operated by the R-Board at the Eskimo Hill Road location.
- The agreement will be effective for 20 years and may be renewed if agreed to by both parties.

- The facility is to be constructed at the expense of EEP. No City, County or R-Board funds are to be applied towards the construction or operation of the facility.
- EEP is responsible for obtaining all air quality and solid waste permits necessary for the construction and operation of the facility.
- EEP is responsible for operating the facility in compliance with all permits issued for the facility.
- EEP is responsible for obtaining local site plan approval.
- The R-Board will provide all MSW received from its operations to the WtE facility.
- The R-Board will keep the tipping fees received from commercial MSW collection services.
- The R-Board will continue current recycling operations, along with the associated revenues.
- The R-Board will accept materials separated from the MSW determined to be unacceptable for processing through the WtE facility, and allow them to be placed in the landfill.

Key financial elements of the agreement are noted below:

- EEP will make a $1 million advance payment to the R-Board.
- EEP will make an additional $1 million payment to the R-Board if the facility is determined to qualify for federal energy tax credits.
- EEP will make a $100,000 lease payment each year to the R-Board.

The property upon which the R-Board operates the landfill is jointly owned by Stafford County and the City of Fredericksburg. Each locality must approve the lease of property, and a public hearing is required prior to action. Stafford County completed this process in June 2013. The City of Fredericksburg is scheduled for final action in August 2013.

Pending approval of a lease by both jurisdictions, and subsequent agreement of the lease terms and execution of the lease by all parties, EEP will proceed with the design, permitting and operation of the WtE.

Frequently Asked Questions

1. What facility is proposed for construction at the R-Board site on Eskimo Hill Road? A firm, Energy Extraction Partners, LLC, is proposing to construct and operate a 15 megawatt electric (MWE) facility. The facility will process all the municipal solid waste (MSW) received at the landfill, along with waste tires, and convert this to a combustible gas capable of powering electrical turbines. The power produced will be sold to Dominion Virginia Power for distribution to customers.
2. Can you put 15 MWE in perspective? For example, how many homes can15 megawatts provide power for? Using conventional calculations of between 1,000 to 1,300 watts per home, the facility can serve up to approximately 15,000 homes.
3. How will this affect the environment? When permitted by the Department of Environmental Quality (DEQ), the proposed project will take the MSW coming into the landfill and divert it for conversion into electricity. The electricity will be produced in a controlled, highly monitored and regulated operation, in a factory like setting. This operation allows the installation of state of the art air pollution control equipment on the few discharge locations, ensuring an air discharge that meets the highest air quality standards. In addition, when placed in operation, the facility will reduce the methane gas produced when MSW is buried.
4. Who is EEP? What are the names of the companies involved in the WtE facility? Energy Extraction Partners, LLC is the name of the business entity formed to construct and operate the

WtE facility in Stafford County. The LLC is comprised of WIT LLC, BB Energy 1 LLC, Creative Energy Systems S-Corp and Energy Funding Partners LLC. The main suppliers included with EEP are Creative Energy Systems Corporation (CES), Combustion Associates, Inc. (CAI), and American Combustion Technologies, Inc. (ACTI).

5. What other WtE facilities does CES have? They are currently working through the approval process for a similar facility in La Junta, Colorado, but the process is further along with Stafford.
6. What are the main components of the proposed WtE facility? The facility proposed for Stafford County consists of 4 main operational areas: intake/separation/pre-processing; pyrolysis; power generation; and byproducts handling. A description of each is as follows:
   Intake/separation/pre-processing: Trucks loaded with MSW are directed to the WtE facility to discharge their loads inside the 120,000 square foot all enclosed facility. The material is segregated and those materials not suitable for processing (concrete, metals, etc.) are directed into recycling for revenue, or to the landfill for burial. Material suitable for synthetic gas production (syngas) are subjected to a 2-stage shredding and conditioning process, dried and converted into stabilized fuel "cubes", which are resistant to decay, provide a consistent fuel quality, and are easily handled.
   Pyrolysis: Once the fuel source is properly conditioned, it is fed into the pyrolysis unit where it is baked in an oxygen starved environment at temperatures up to 1,500 degrees Fahrenheit to break the feedstock into syngas and byproducts. The material is not burned, or exposed to direct contact with flames. The oxygen starved environment inhibits the creation of dioxins.
   Electrical production: the syngas is compressed and stored to be used as fuel to power the turbines which produce the electricity. The turbines feed electricity into the Dominion Virginia Power grid in the vicinity of Eskimo Hill Road.
   Byproducts processing: There are 2 byproducts from pyrolysis; ash and a tar-like residue. Both products have market potential as cement additive, soil amendment, etc. If no market is financially feasible, these products can be directed safely to the landfill if necessary. We understand that identifying a market destination for these byproducts is a high priority for EEP.
7. Where will the MSW come from? The MSW for this facility will come only from Stafford County and City of Fredericksburg. No outside MSW is proposed or permitted. It is expected that on average, 3 to 5 truckloads per day of waste tires collected in Virginia will be brought in for the operation of this facility.
8. Has this type of facility been tested anywhere else in the U.S.? The main component in the process – the pyrolysis unit – has been tested by the Department of Energy during an environmental assessment and found to meet all emission standards. There is an operational unit running in Los Angeles, California producing diesel fuel for the U.S. Navy. Testing at the California facility was conducted to provide data for the operation and air quality for facility in Stafford.
9. Is this technology in operation elsewhere in the world? Yes, pyrolysis units are in operation in Europe and the Far East. The particular unit under consideration in Stafford is manufactured in California. The waste segregation and preprocessing units are also in operation around the world.

   Gas turbine electrical generation is quite common in the United States; in fact, 2 such turbines operating at 1 MWE each are in operation at the landfill. They run on methane gas recovered from the previously closed landfill cells.
10. What permits are required to construct and operate a WtE facility? The Commonwealth of Virginia – through the Department of Environmental Quality (DEQ) – will permit this facility for both MSW handling and air quality. The landfill currently operates under a solid waste permit and an air quality permit. These permits would be modified, but remain in place, while EEP would obtain new permits for their operation. EEP will be required to perform tests and analysis to demonstrate that the facility can meet stringent air pollution requirements.

11. Will there be equipment installed to reduce or eliminate air pollution? Yes. Even though the discharge from a pyrolysis unit is far less than incineration, a scrubber is required to assure compliance. There are multiple discharge points in the process from the preprocessing dryer, the pyrolysis unit, and the exhaust from the turbines. Each of these points will be monitored by DEQ for compliance. The allowable concentrations, frequency of testing, and reporting requirements will be established by DEQ during the development of the permit requirements.
12. Will there be any smokestacks? No. Smokestacks are a component of direct combustion facilities like incinerators. There will be no direct combustion of MSW at this facility. As noted above, there will be vent stacks at a few locations to allow the dissipation of heat from the turbines and the pyrolysis units.
13. Why and how are tires used in the process? Tires are proposed as a high energy supplement to the MSW used in the process. MSW is variable in content, resulting in inconsistent British Thermal Unit (BTU) value. Processed tire waste is added to the MSW to provide more consistency and a higher BTU value. It is expected that the feed material will consist of approximately 30% tires. The tires are also received inside the facility, where they are shredded to remove the steel reinforcing. The steel is recycled, while the rubber mixed with MSW is then fed to the pyrolysis unit.
14. Will the introduction of tires into the process result in poorer air quality? No. The air discharge permit limits will be set at the same stringent levels with or without the addition of material from tires. The facility must demonstrate it will meet those limits prior to receiving an operational permit, and must operate in compliance with permitted limits. Failure to do so risks enforcement action from DEQ up to and including closure of the facility.
15. What about noise? All operations will be enclosed in a 120,000 square foot building. The gas powered electrical turbines produce the greatest amount of noise. They will be individually enclosed in a sound attenuating enclosure. The turbines will operate at about 94 decibels inside the building. This is less than the sound of a hand drill (98 db) or a lawn mower (107db). The site will be surrounded by several acres of forested buffer, and located in the interior portion of the landfill site. The noise generated by this facility, as observed at the border of R-Board property, will be miniscule. In addition, there will be a significant drop in current landfill MSW handling activities, decreasing net noise levels.
16. How large is the facility proposed at the landfill? EEP is proposing a 120,000 square foot facility on about 11 acres. The building, with access, parking, stormwater management, etc. will take occupy about5 acres, with the balance of the area providing a buffer for the plant.
17. Who will pay for the cost of the facility? EEP is entirely responsible for the costs associated with the design, permitting, construction and operation of the WtE facility.
18. How many employees are necessary to operate the facility? EEP expects to hire a staff of 65 to operate the facility. No new R-Board employees will be required for this project.
19. When will the facility be in operation? EEP is scheduled to begin limited operation at the end of 2014.
20. How will the $1 million payment be used? The $1 million advance payment to the R-Board under the agreement has been proposed to help fund improvements to Eskimo Hill Road, estimated to cost $7.35 million. While the proposed facility will not increase traffic appreciably, the narrow, winding road with no shoulders is inadequate for the commercial waste haulers presently accessing the landfill.
21. Will there be increased user fees for Stafford and Fredericksburg citizens using the landfill because of this new facility? No. Current policy is that the R-Board does not charge residents for MSW they bring to the Eskimo Hill Road or Belman sites. This is not expected to change. Charges to commercial haulers for residential waste are not expected to increase either.